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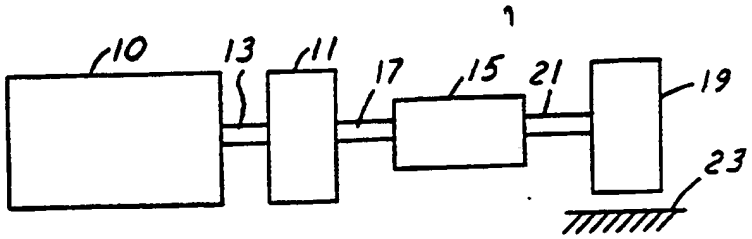


FIG. 1

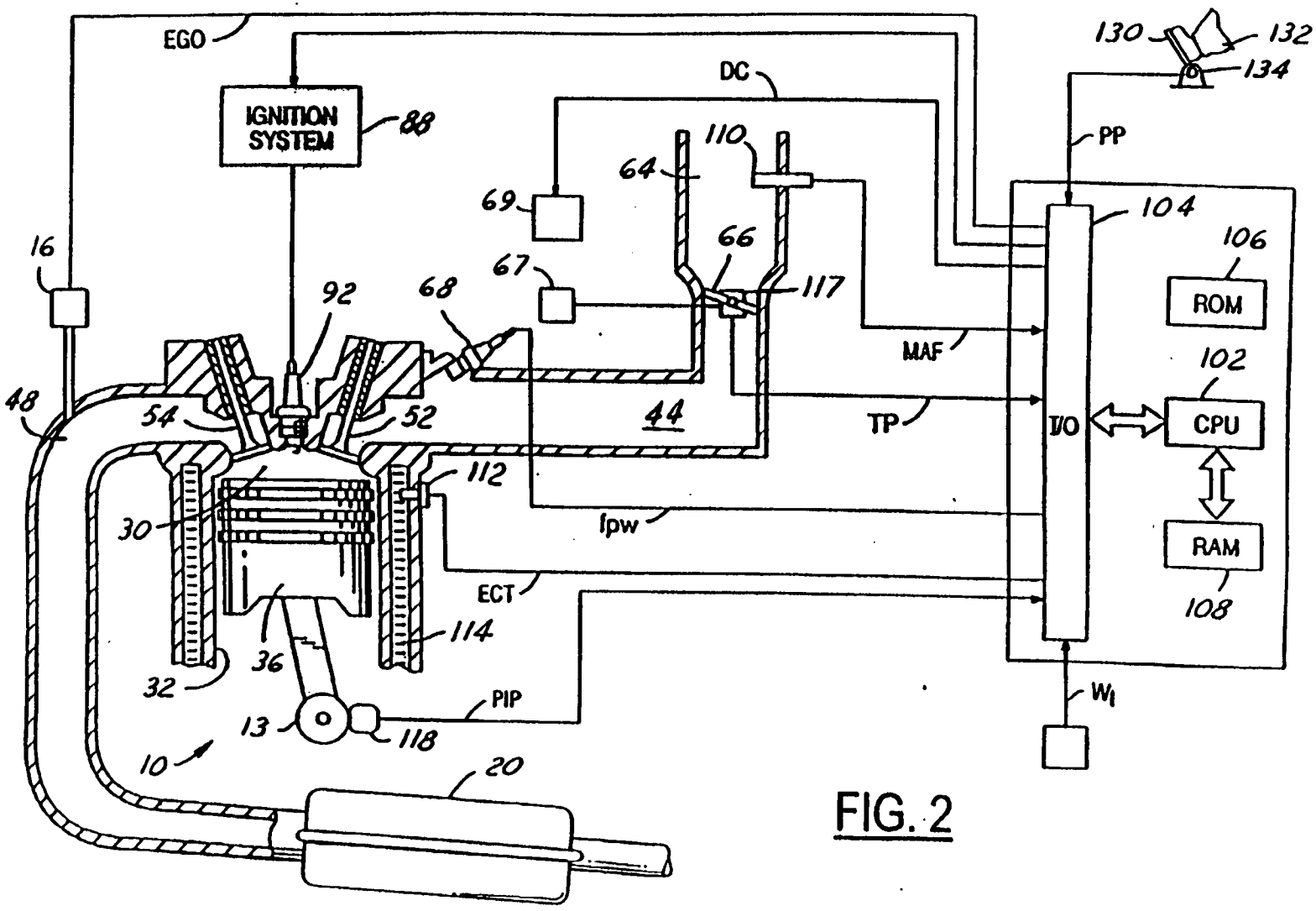
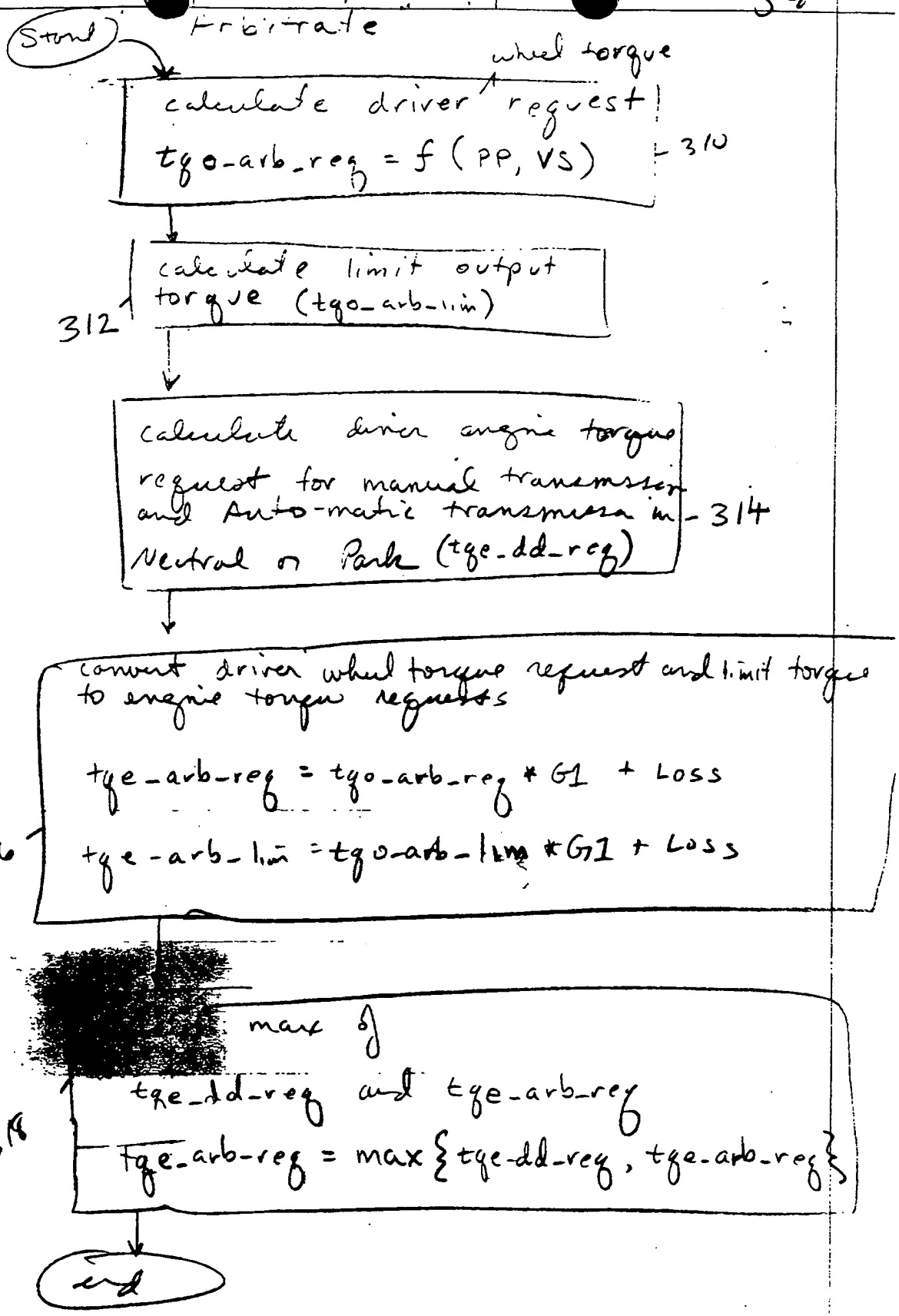

EGO
IGNITION SYSTEM
88
DC
110
64
69
67
66
117
68
92
16
48
54
52
44
112
30
fpw
ECT
114
36
32
13
PIP
118
10
20
130
132
134
PP
104
106
ROM
MAF
102
TP
I/O
CPU
RAM
108
W1

FIG. 2


Start
Arbitrate
wheel torque
calculate driver request
tqo_arb_req = f(PP, VS)
310
calculate limit output torque (tqo_arb_lim)
312
calculate driver engine torque request for manual transmission and Auto-matic transmission Neutral or Park (tqe_dd_req)
314
convert driver wheel torque request and limit torque to engine torque requests
tqe_arb_req = tqo_arb_req * G1 + Loss
tqe_arb_lim = tqo_arb_lim * G1 + Loss
316
max of
tqe_dd_req and tqe_arb_req
tqe_arb_req = max{tqe_dd_req, tqe_arb_req}
318
end

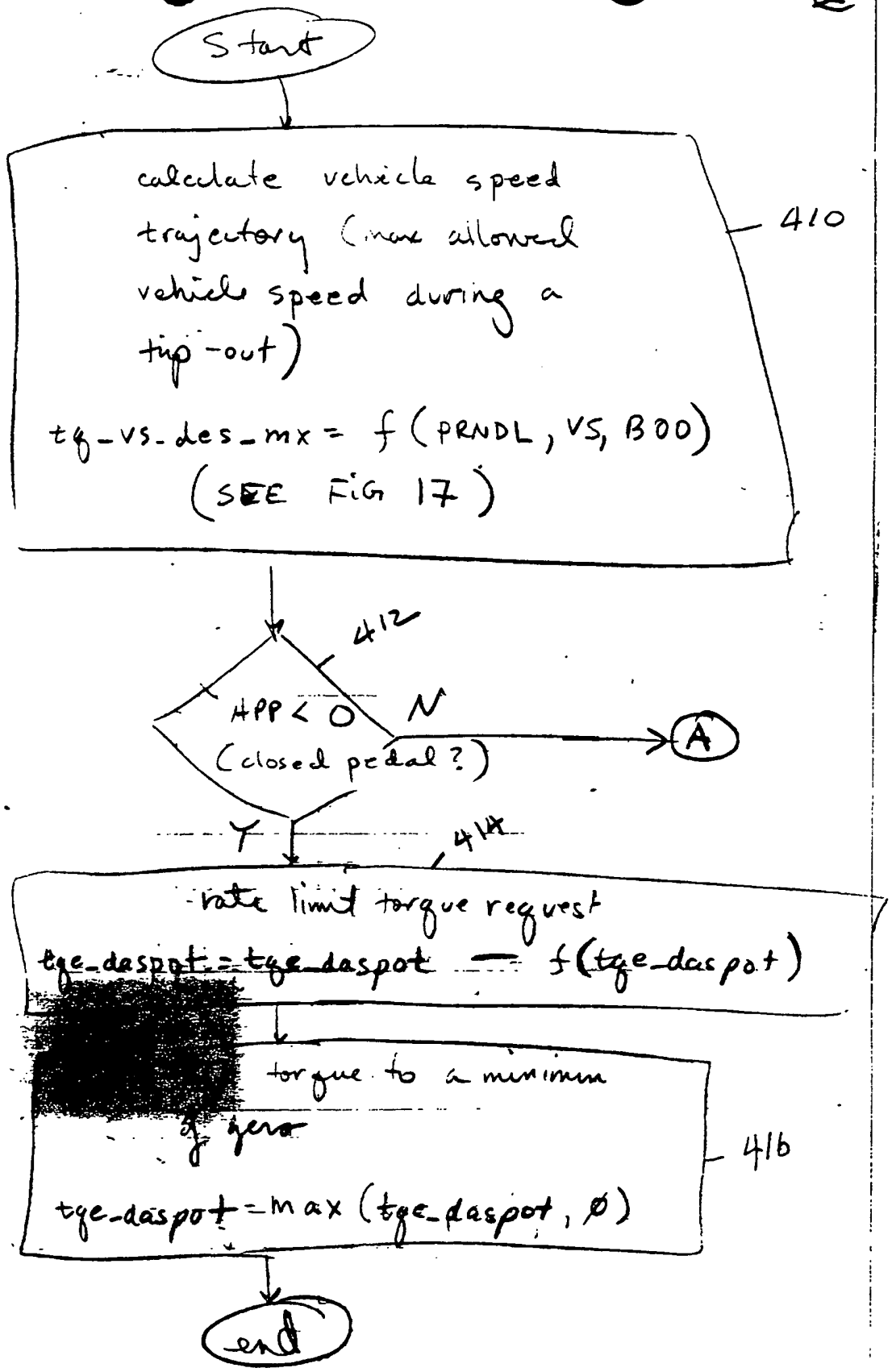
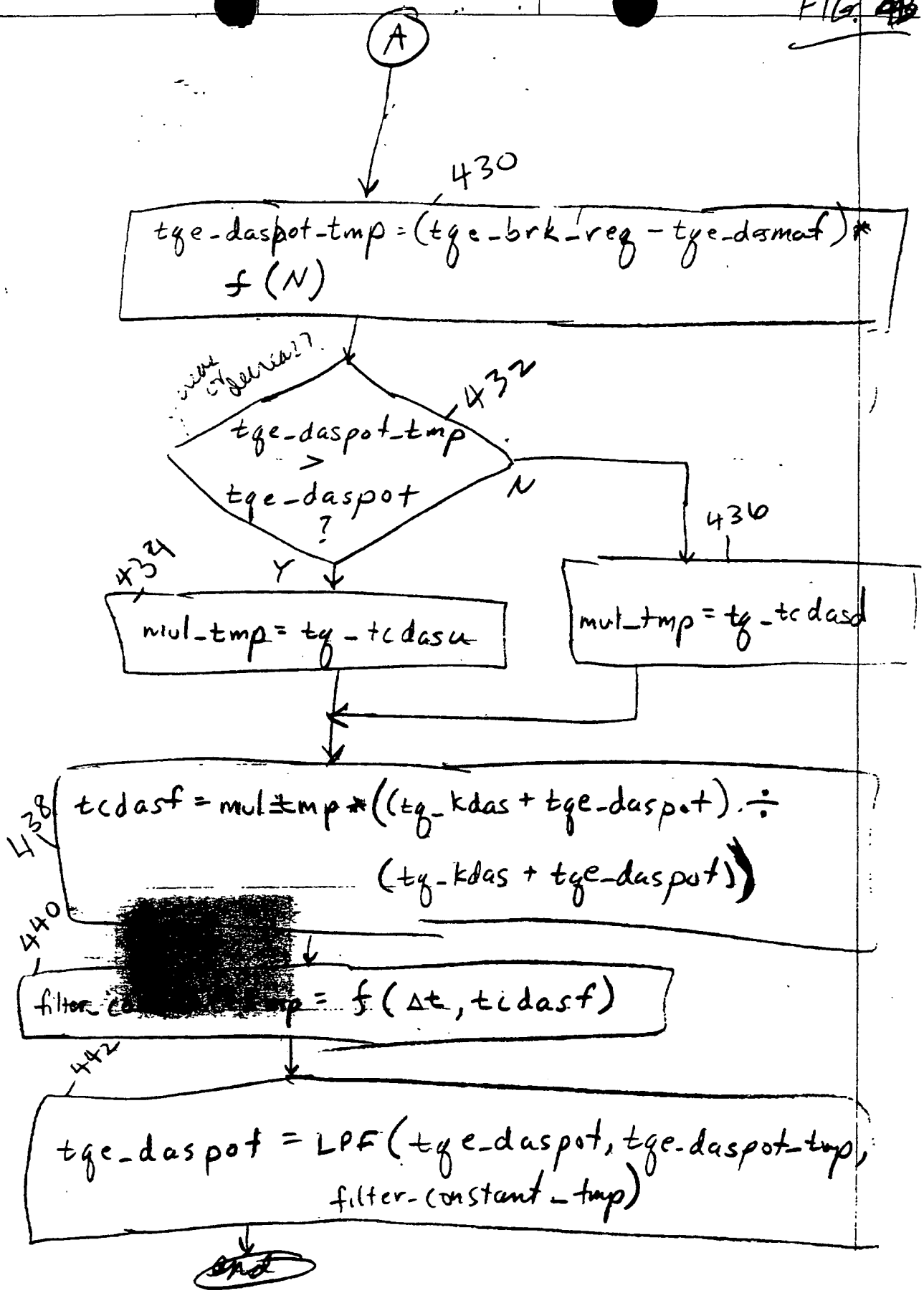

Start
calculate vehicle speed trajectory (max allowed vehicle speed during a tip-out)
tq_vs_des_mx = f(PRNDL, VS, B00)
(SEE FIG 17)
410
412
APP < 0 (closed pedal?)
N
A
Y
414
rate limit torque request
tqe_daspot = tqe_daspot — f(tqe_daspot)
torque to a minimum of zero
416
tqe_daspot = max(tqe_daspot, 0)
end

FIG. 4B


A
430
tqe_daspot_tmp = (tqe_brk_req - tqe_dsmaf) * f(N)
432
tqe_daspot_tmp > tqe_daspot ?
N
Y
436
434
mul_tmp = tq_tcdasd
mul_tmp = tq_tcdasu
438
tcdasf = mul_tmp * ((tq_kdas + tqe_daspot) ÷ (tq_kdas + tqe_daspot))
440
filter_constant_tmp = f(Δt, tcdasf)
442
tqe_daspot = LPF(tqe_daspot, tqe_daspot_tmp, filter_constant_tmp)
end

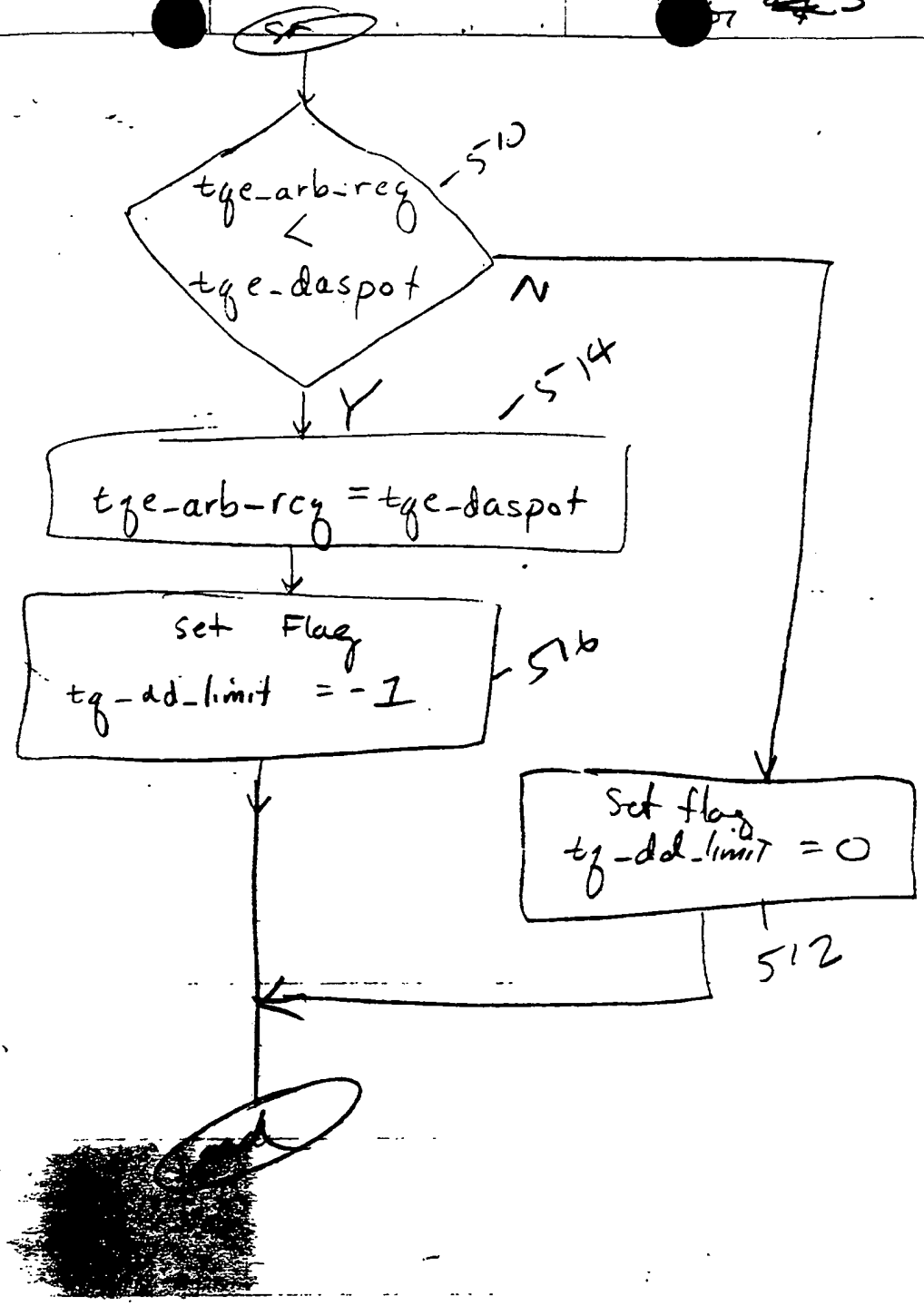
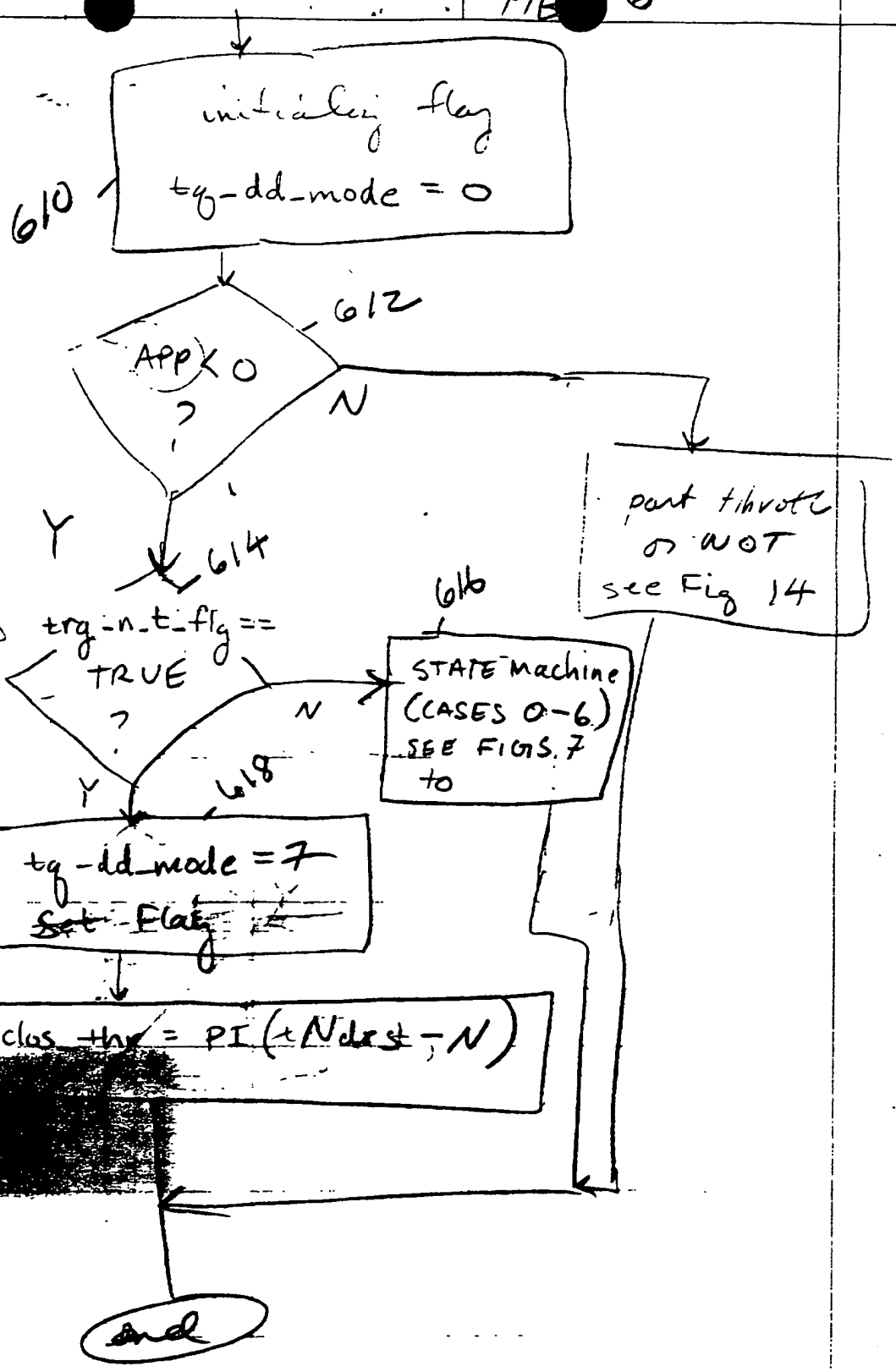

SE
tqe_arb_req
<
tqe_daspot
510
N
Y
514
tqe_arb_req = tqe_daspot
Set Flag
tq_dd_limit = -1
516
Set flag
tq_dd_limit = 0
512

FIG 6


initialize flag
tq-dd_mode = 0
610
APP < 0 ?
612
N
Y
614
part throttle or NOT see Fig 14
trq_n_t_flg == TRUE ?
616
N
STATE machine (CASES 0-6) SEE FIGS. 7 to
Y
618
tq-dd_mode = 7
Set Flag
tqe_clos_thr = PI(+Ndest, N)
end

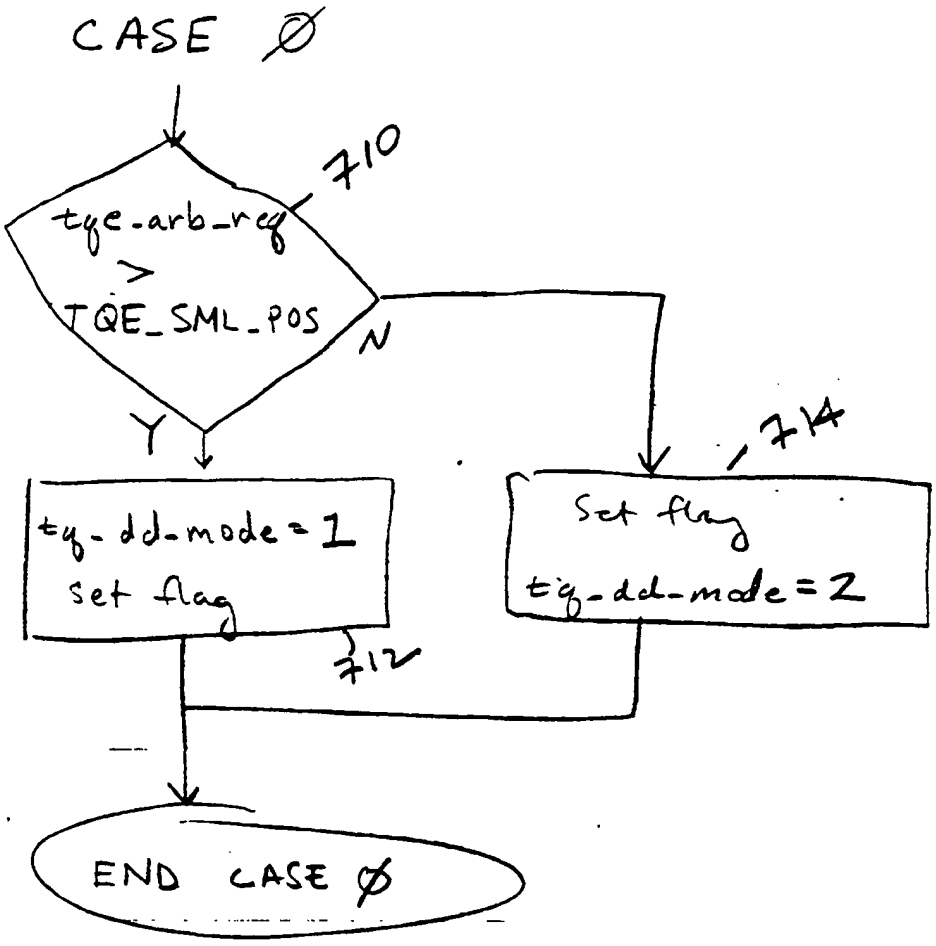

CASE Ø
710
tqe_arb_req
>
TQE_SML_POS
N
Y
714
tq_dd_mode = 1
set flag
712
Set flag
tq_dd_mode = 2
END CASE Ø

FIG. 8

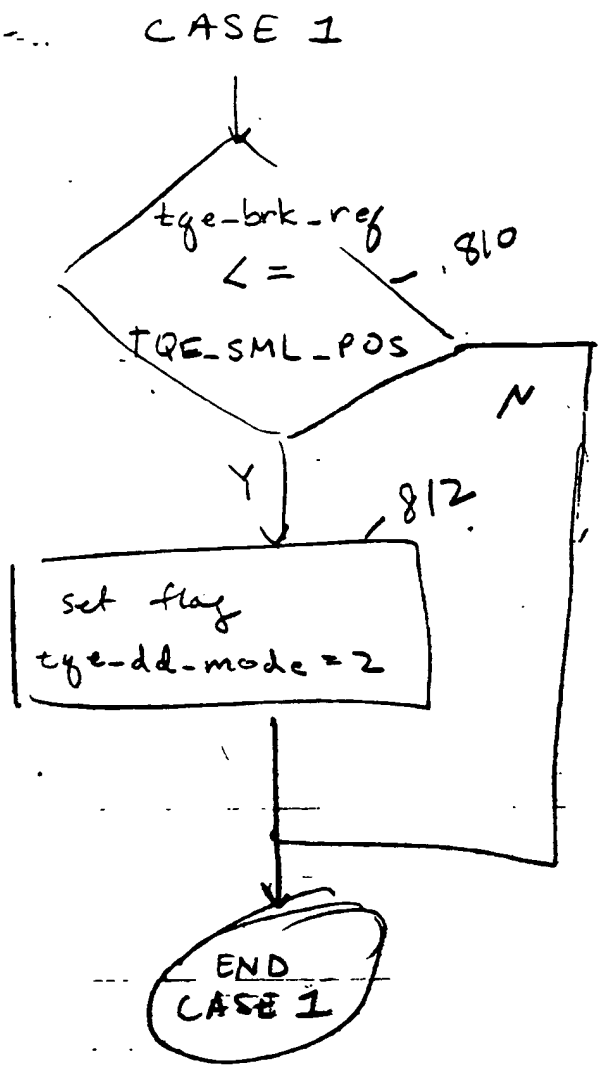

CASE 1
tqe_brk_req
<=
TQE_SML_POS
810
N
Y
812
set flag
tqe_dd_mode = 2
END
CASE 1

FIG. 9

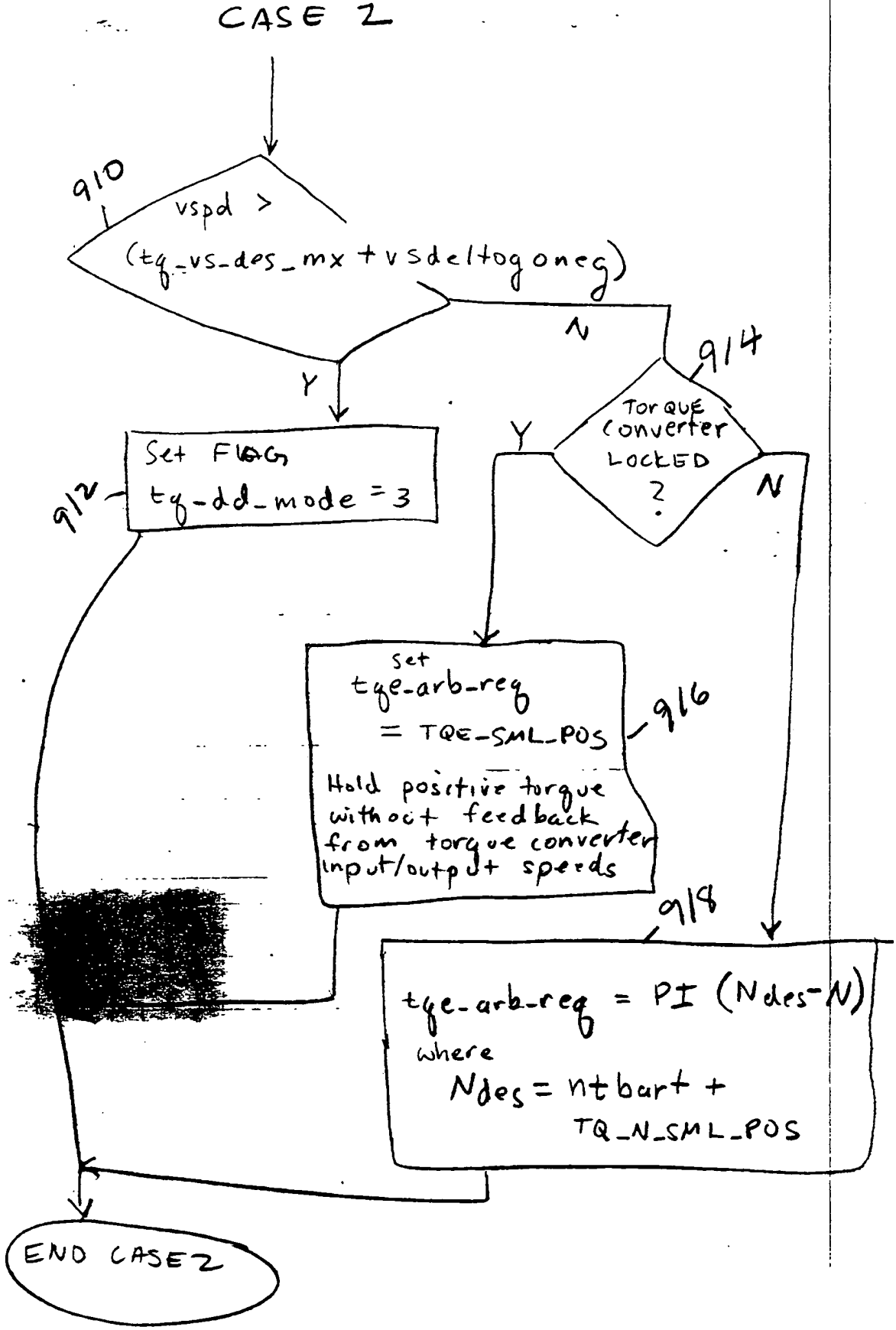

CASE 2
910
vspd >
(tq_vs_des_mx + vsdeltogoneg)
Y
N
914
Torque Converter LOCKED ?
Y
N
Set FLAG
tq_dd_mode = 3
912
set
tqe_arb_req
= TQE_SML_POS
916
Hold positive torque without feedback from torque converter input/output speeds
918
tqe_arb_req = PI (Ndes - N)
where
Ndes = ntbart + TQ_N_SML_POS
END CASE2

FIG. 10

CASE 3 ZERO TORQUE CROSSING

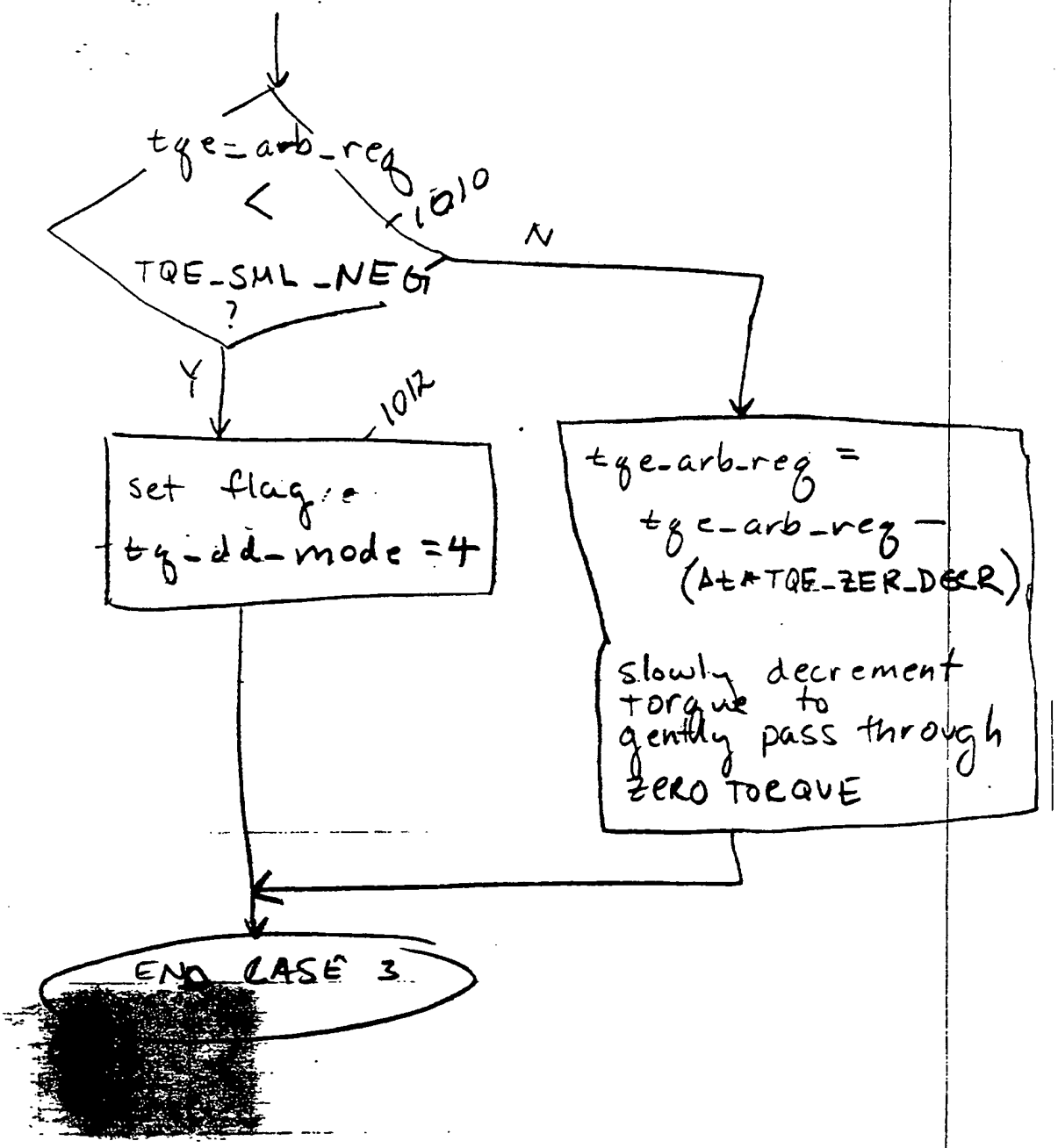


Fig. 11

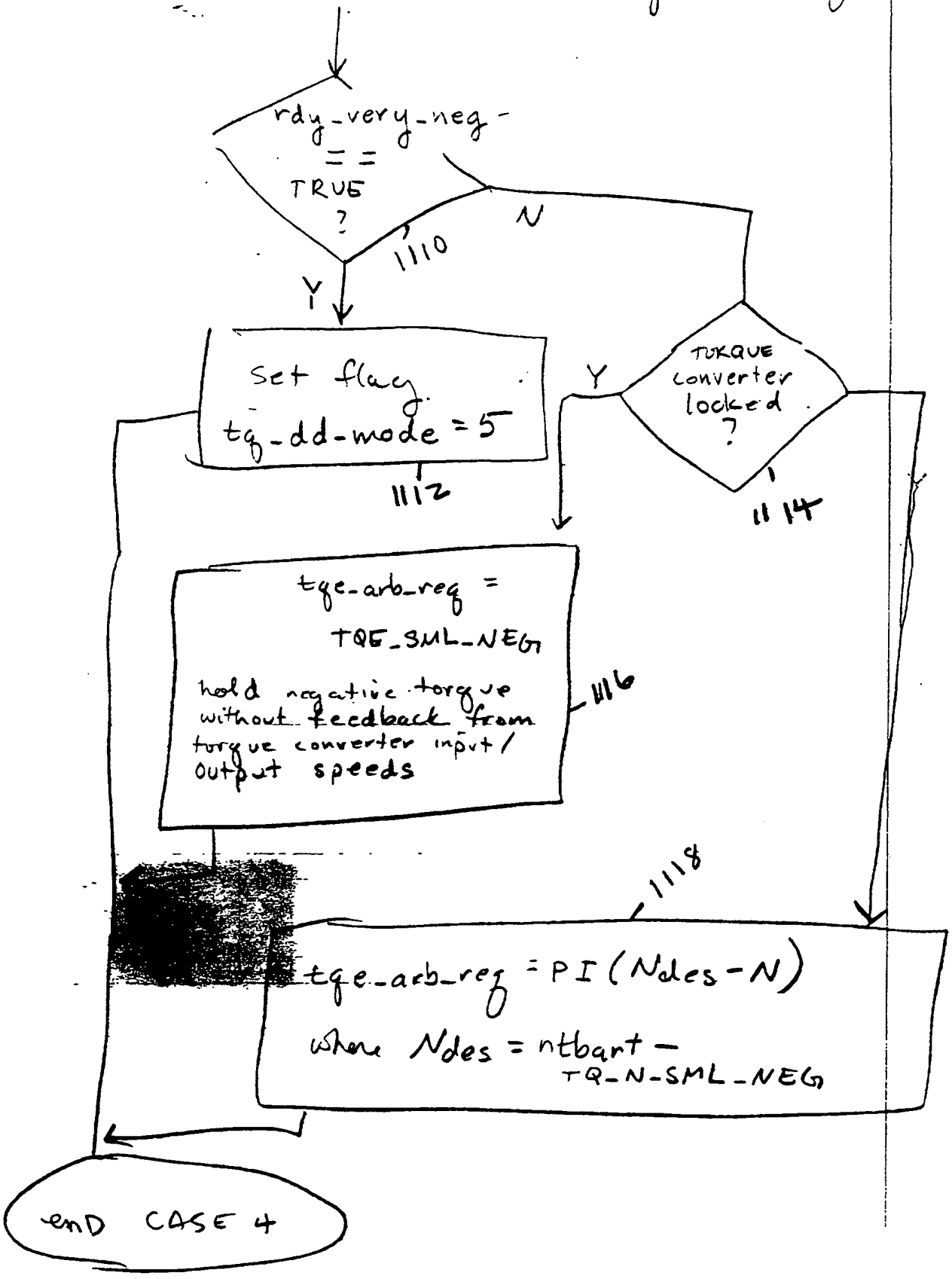

CASE 4 Hold Negative Torque
rdy_very_neg_ == TRUE ?
1110
N
Y
Set flag tq_dd_mode = 5
1112
TORQUE converter locked ?
Y
1114
tqe_arb_req = TQE_SML_NEG
hold negative torque without feedback from torque converter input/output speeds
1116
1118
tqe_arb_req = PI (Ndes - N)
where Ndes = ntbart - TQ_N_SML_NEG
end CASE 4

Fig. 12

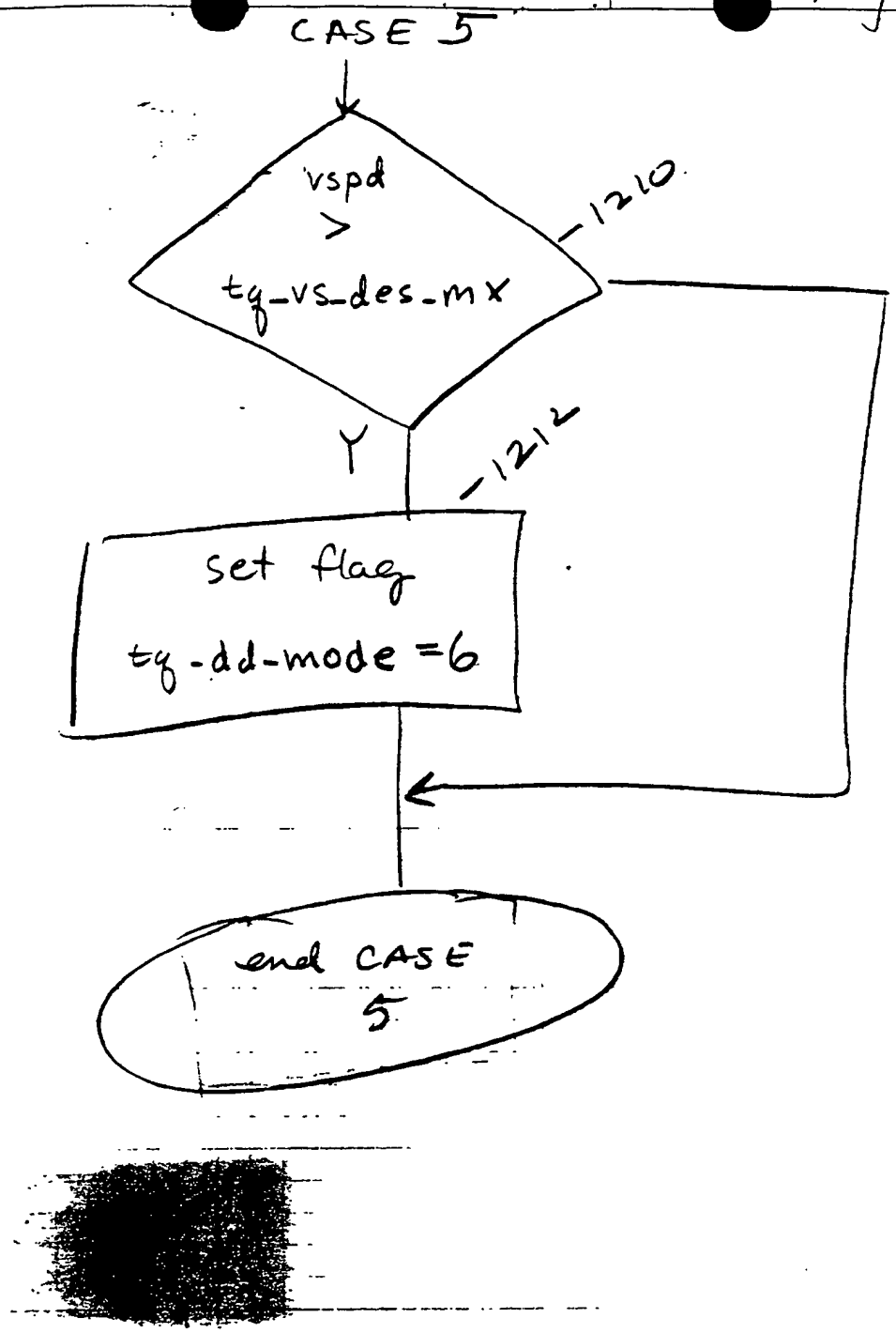

CASE 5
vspd
>
tq_vs_des_mx
1210
Y
1212
set flag
tq-dd-mode =6
end CASE
5

FIG. 13

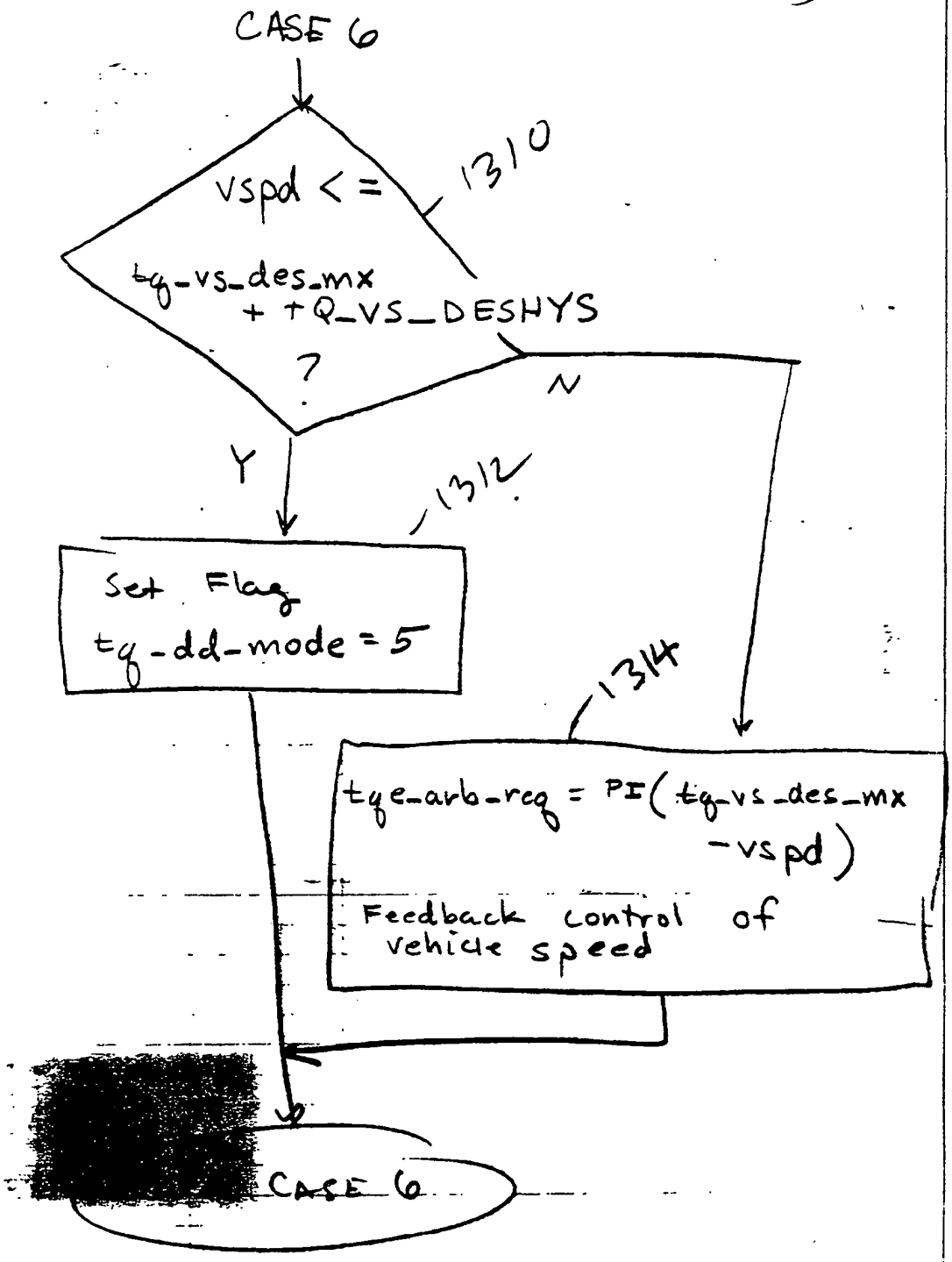

CASE 6
vspd <=
tq_vs_des_mx
+ tQ_VS_DESHYS
?
1310
Y
N
1312
Set Flag
tq_dd_mode = 5
1314
tqe_arb_req = PI(tq_vs_des_mx
- vspd)
Feedback control of
vehicle speed
CASE 6

Fig. 14A

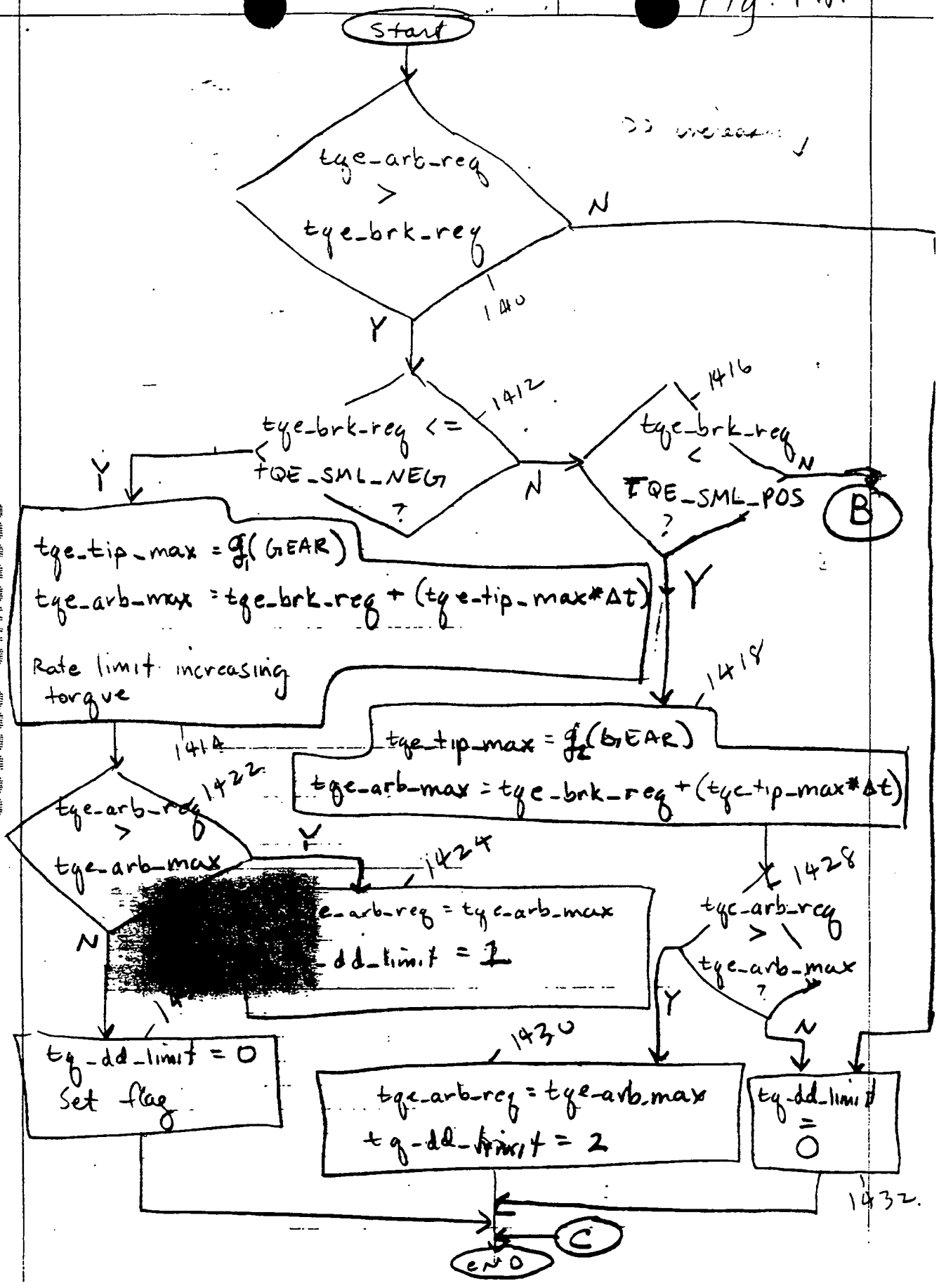

Start
tqe_arb_req > tqe_brk_req
N
Y
1410
tqe_brk_req <= TQE_SML_NEG ?
1412
Y
N
tqe_brk_req < TQE_SML_POS ?
1416
N
B
Y
tqe_tip_max = f1(GEAR)
tqe_arb_max = tqe_brk_req + (tqe_tip_max*Δt)
Rate limit increasing torque
1414
1418
tqe_tip_max = f2(GEAR)
tqe_arb_max = tqe_brk_req + (tqe_tip_max*Δt)
tqe_arb_req > tqe_arb_max
1422
N
Y
1424
tqe_arb_req = tqe_arb_max
tq_dd_limit = 1
1428
tqe_arb_req > tqe_arb_max ?
Y
N
tq_dd_limit = 0
Set flag
1430
tqe_arb_req = tqe_arb_max
tq_dd_limit = 2
tq_dd_limit = 0
1432
C
END

Fig. 14B

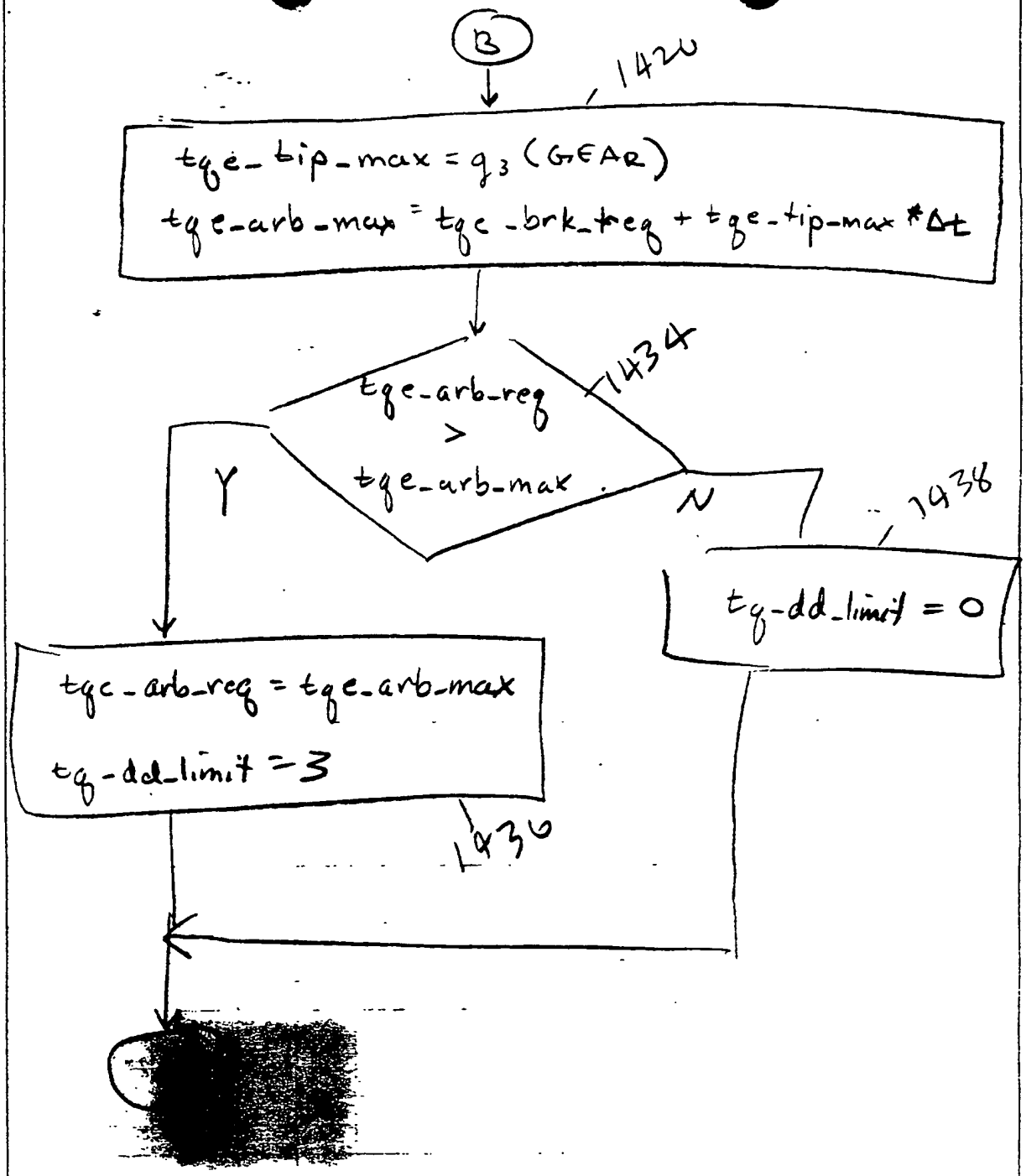

B
1420
tqe_tip_max = q3 (GEAR)
tqe_arb_max = tqe_brk_req + tqe_tip_max * Δt
tqe_arb_req > tqe_arb_max
1434
Y
N
1436
tq_dd_limit = 0
tqc_arb_req = tqe_arb_max
tq_dd_limit = 3
1430

FIG. 15

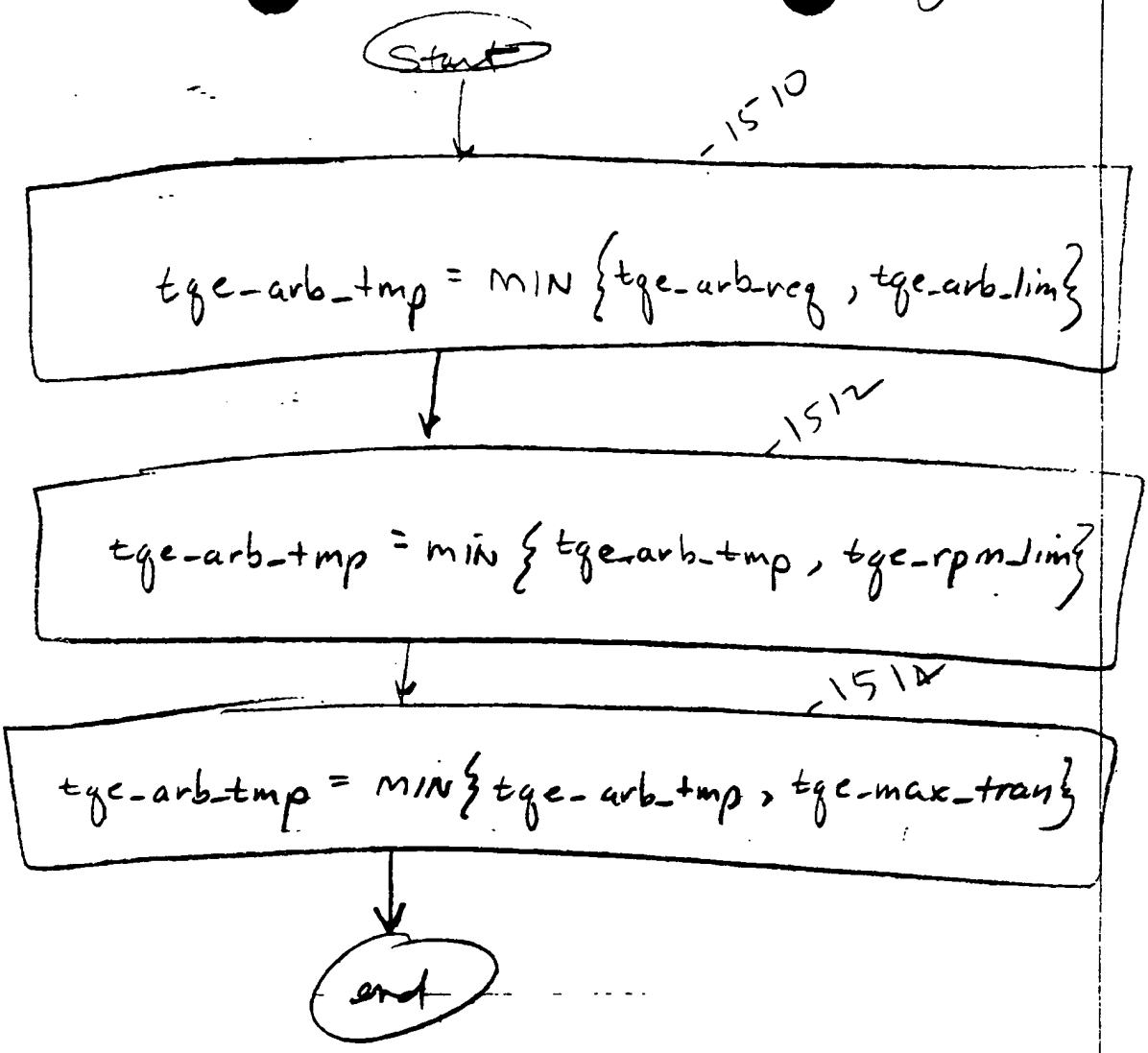

start
1510
tqe_arb_tmp = MIN { tqe_arb_req , tqe_arb_lim }
1512
tqe_arb_tmp = MIN { tqe_arb_tmp , tqe_rpm_lim }
1514
tqe_arb_tmp = MIN { tqe_arb_tmp , tqe_max_tran }
end

FIG. 16A

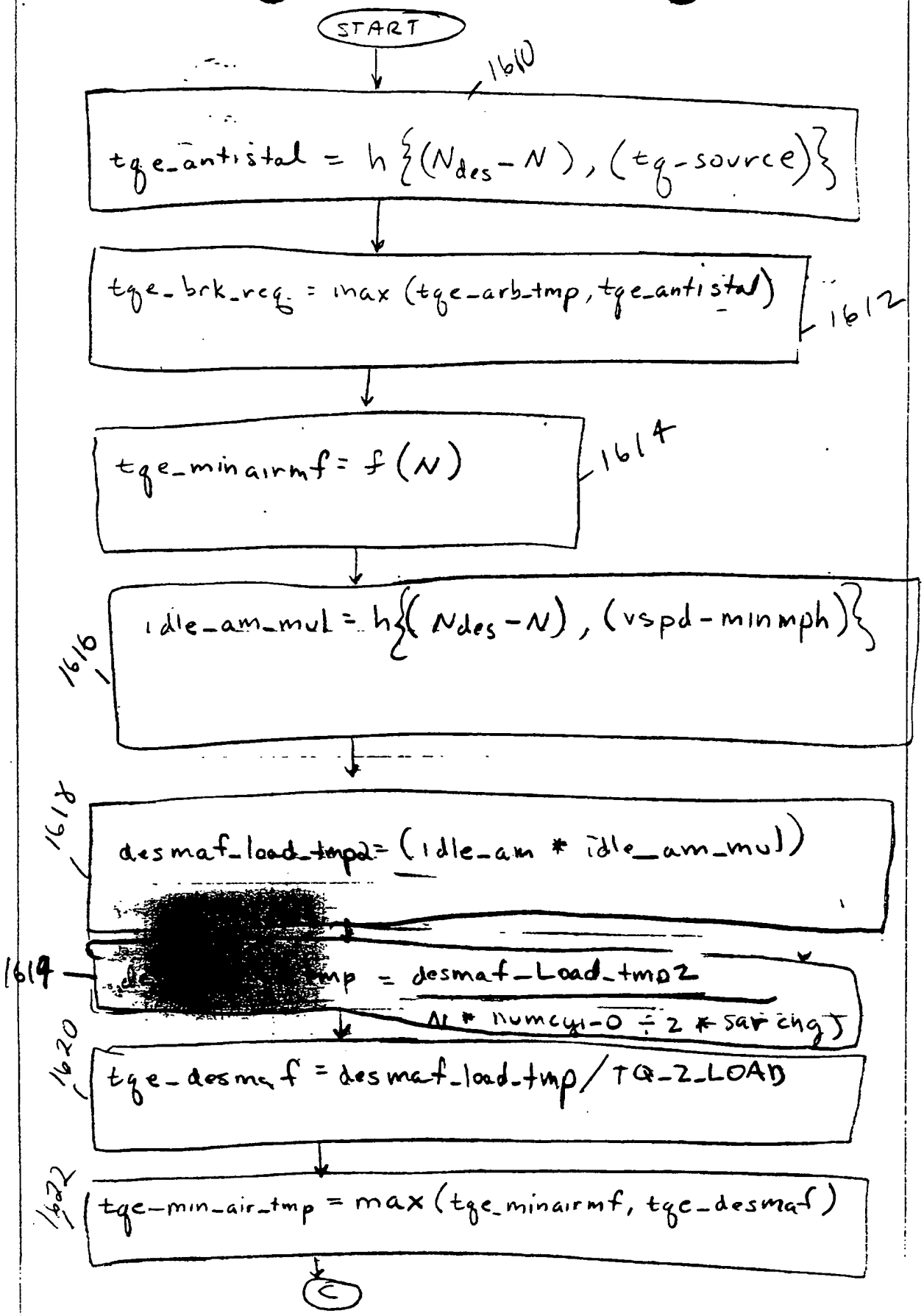

START
1610
tqe_antistal = h{(Ndes - N), (tq-source)}
tqe_brk_req = max (tqe_arb_tmp, tqe_antistal)
1612
tqe_minairmf = f(N)
1614
idle_am_mul = h{(Ndes - N), (vspd - minmph)}
1616
desmaf_load_tmp2 = (idle_am * idle_am_mul)
1618
tmp = desmaf_Load_tmp2
* numcyl-0 ÷ 2 * sar chg)
1620
tqe_desmaf = desmaf_load_tmp / TQ-2-LOAD
1622
tqe_min_air_tmp = max (tqe_minairmf, tqe_desmaf)
C

Fig. 16B

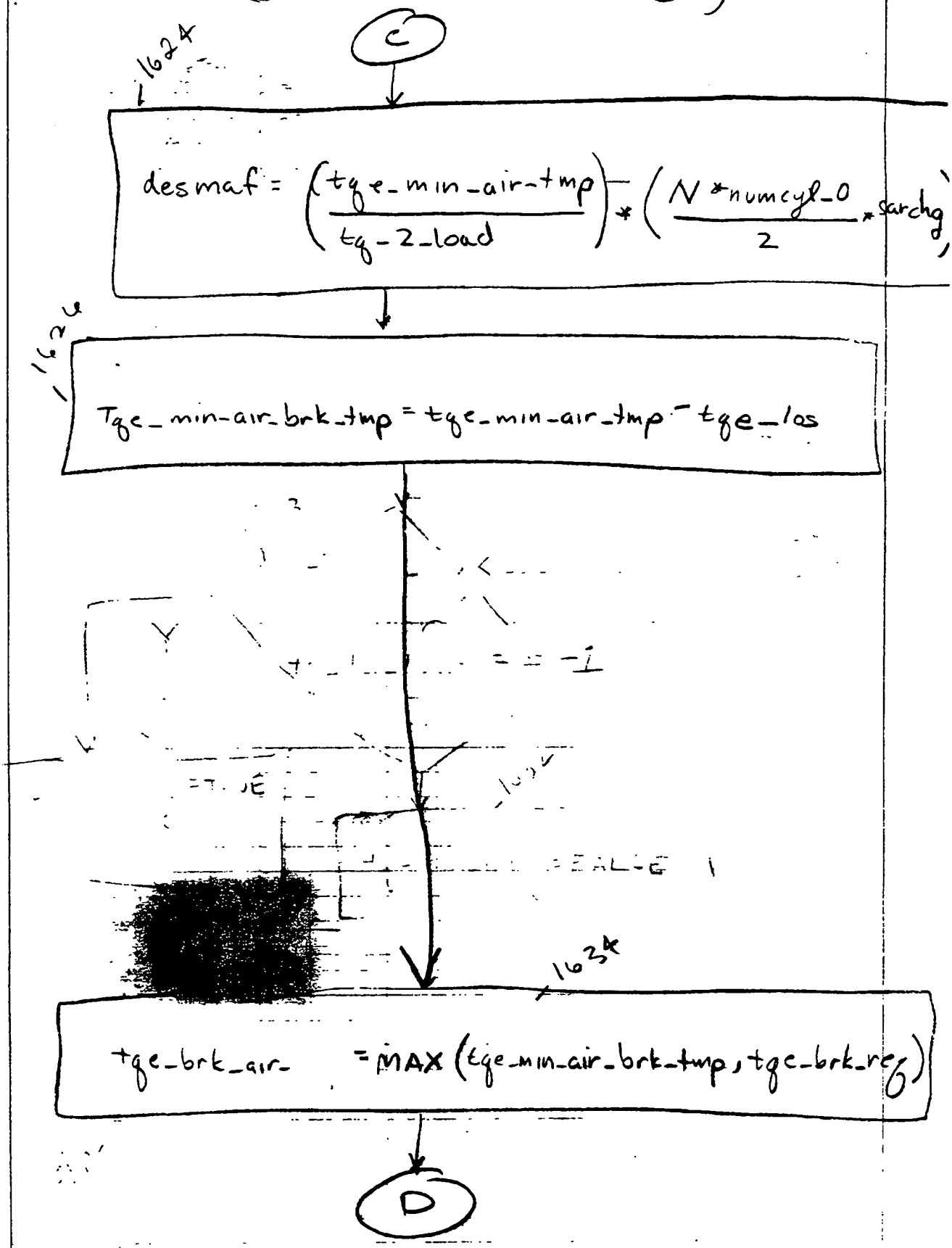

C
1624
desmaf = (tqe_min_air_tmp / tq_2_load) * (N * numcyl_0 / 2 * starchg
1626
Tqe_min_air_brk_tmp = tqe_min_air_tmp - tqe_los
1628
tqe_brk_air = MAX (tqe_min_air_brk_tmp, tqe_brk_req)
D

Fig 16C

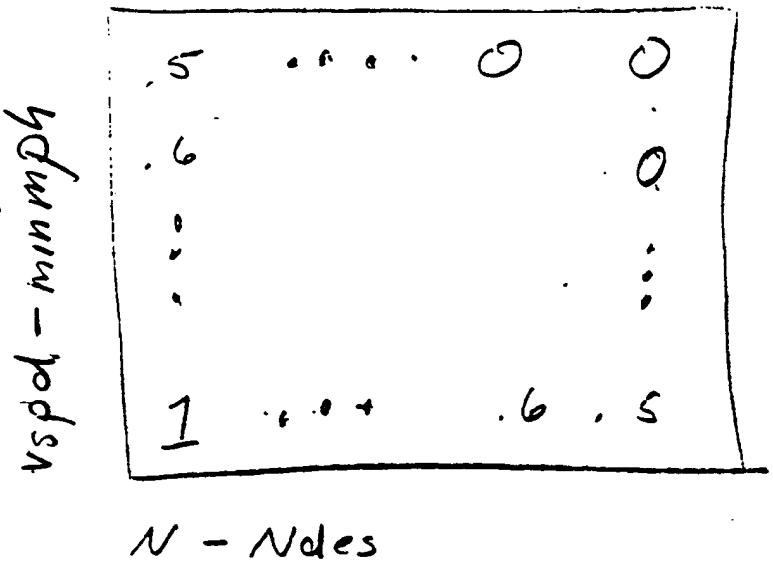
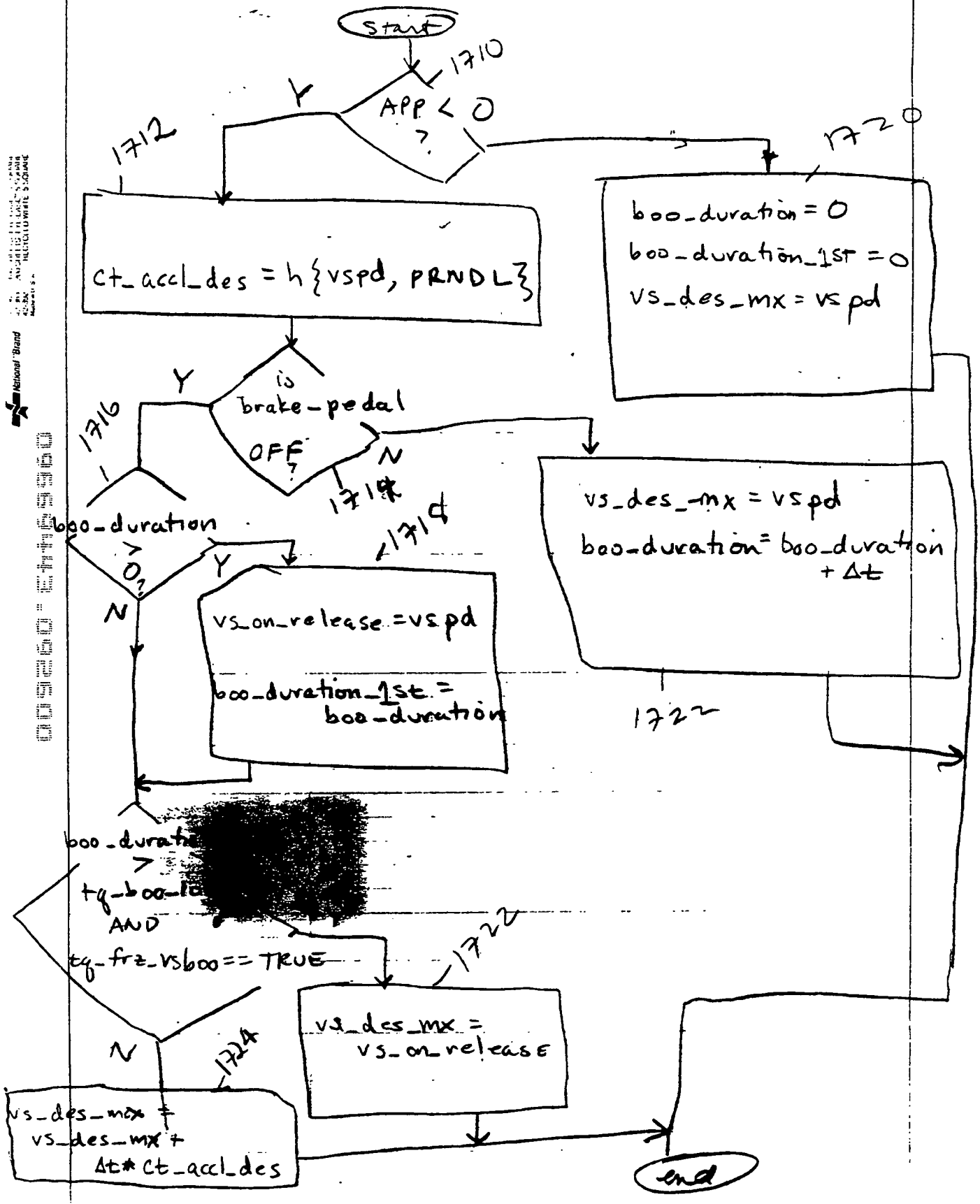


Fig. 17

STEP of FIGURE 4



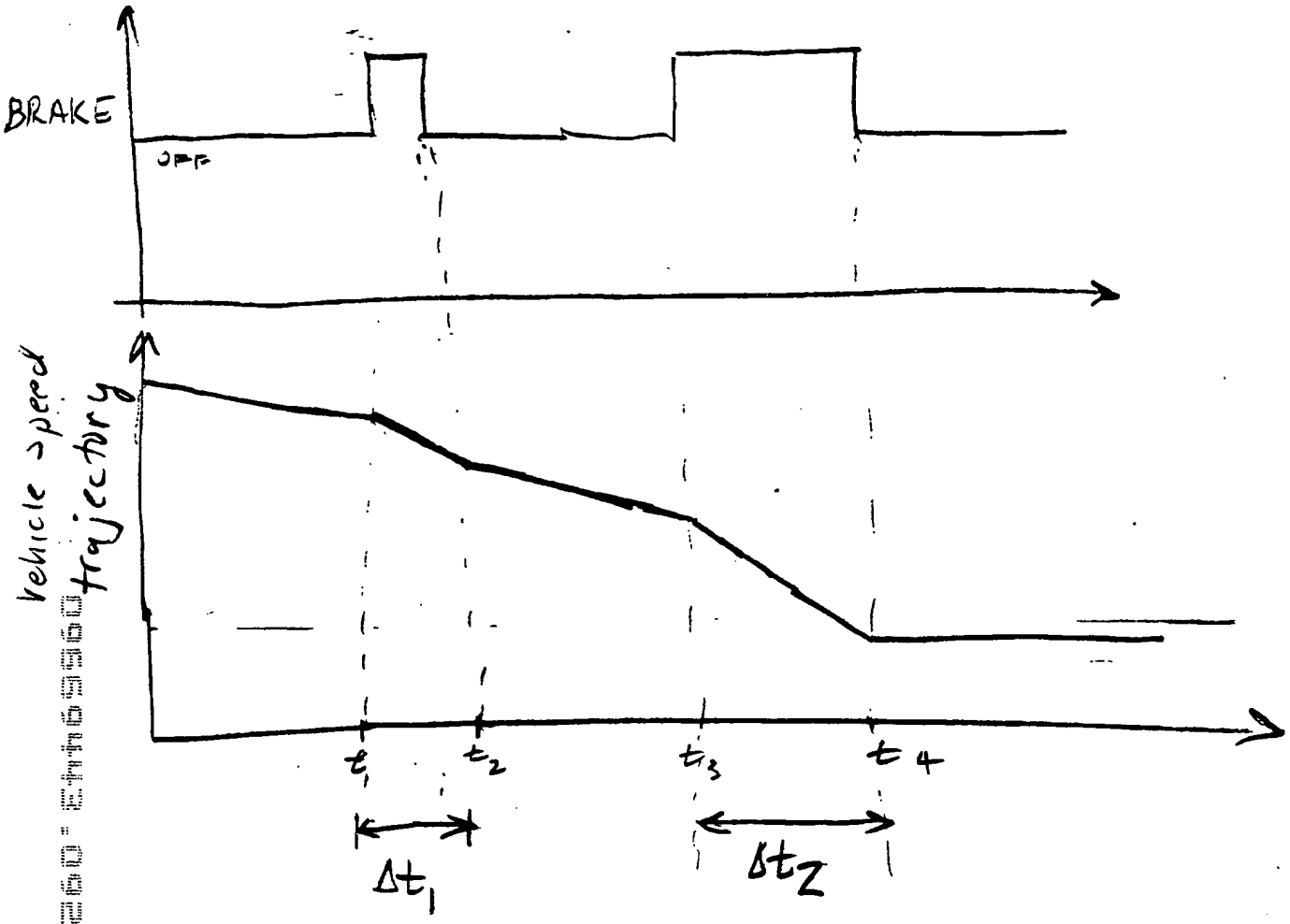

BRAKE
OFF
Vehicle speed trajectory
t_1
t_2
t_3
t_4
Δt_1
Δt_2

Fig 17B

Fig. 18

#4

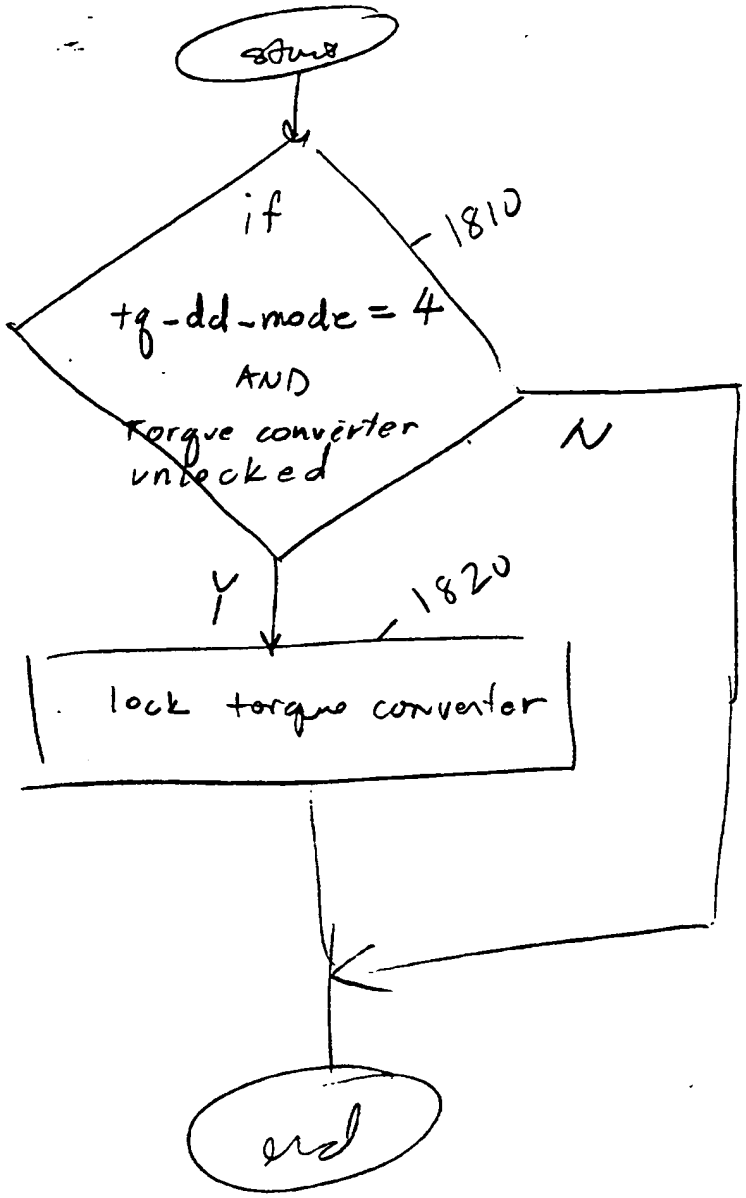
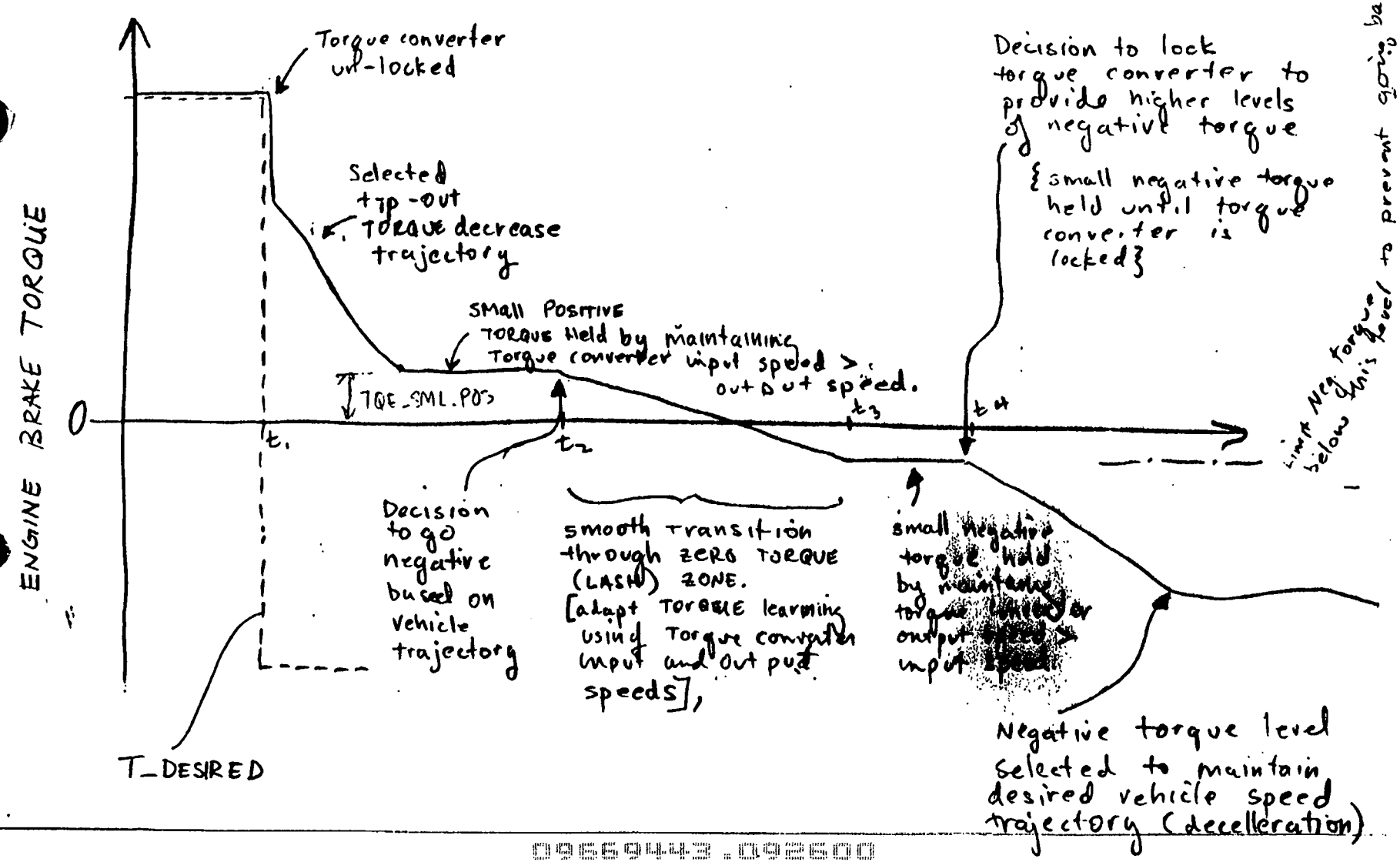

start
if
tq-dd-mode = 4
AND
torque converter
unlocked
1810
N
Y
1820
lock torque converter
end

Fig. 18

TIP-OUT CONTROL (1)



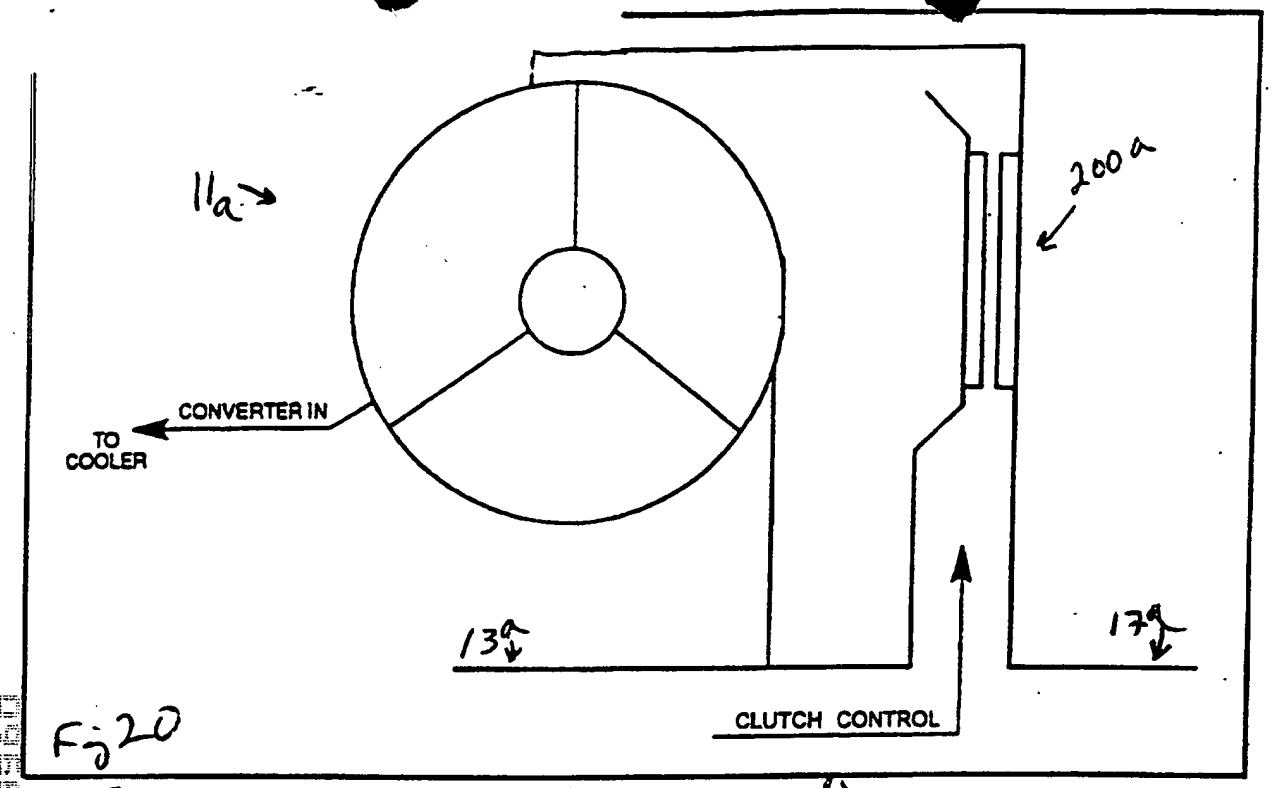


Fig 20

~~Figure 19~~ – Two-Circuit Unlock Converter Clutch (Disengaged)

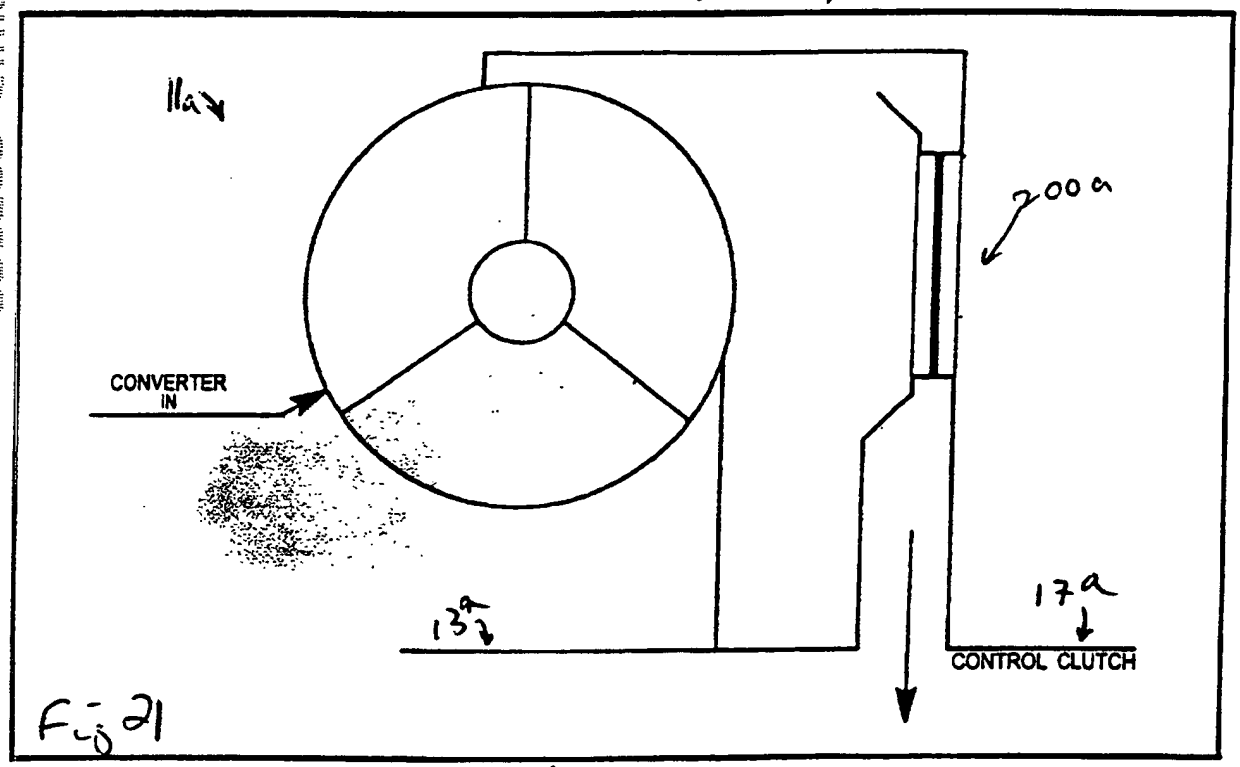


Fig 21

~~Figure 20~~ – Two-Circuit Lockup Converter Clutch (Engaged)

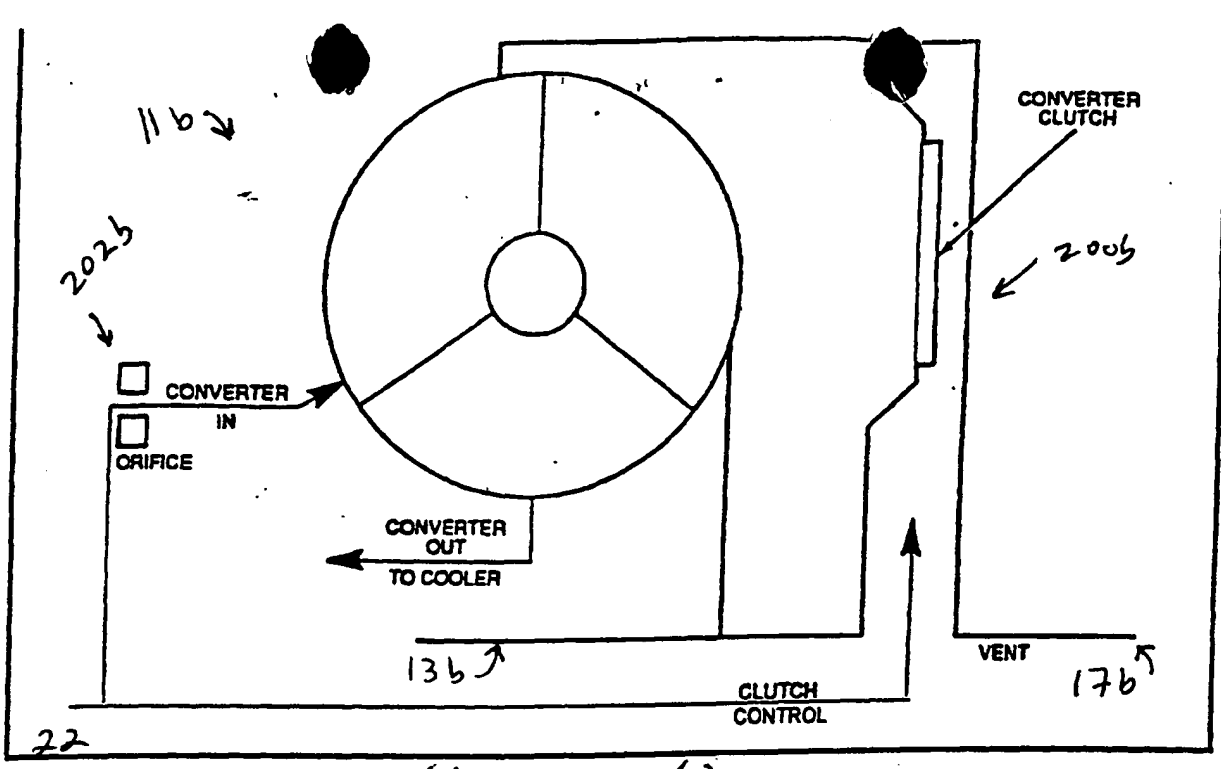


Figure 18 – Three-Circuit Unlock Mode (disengaged)

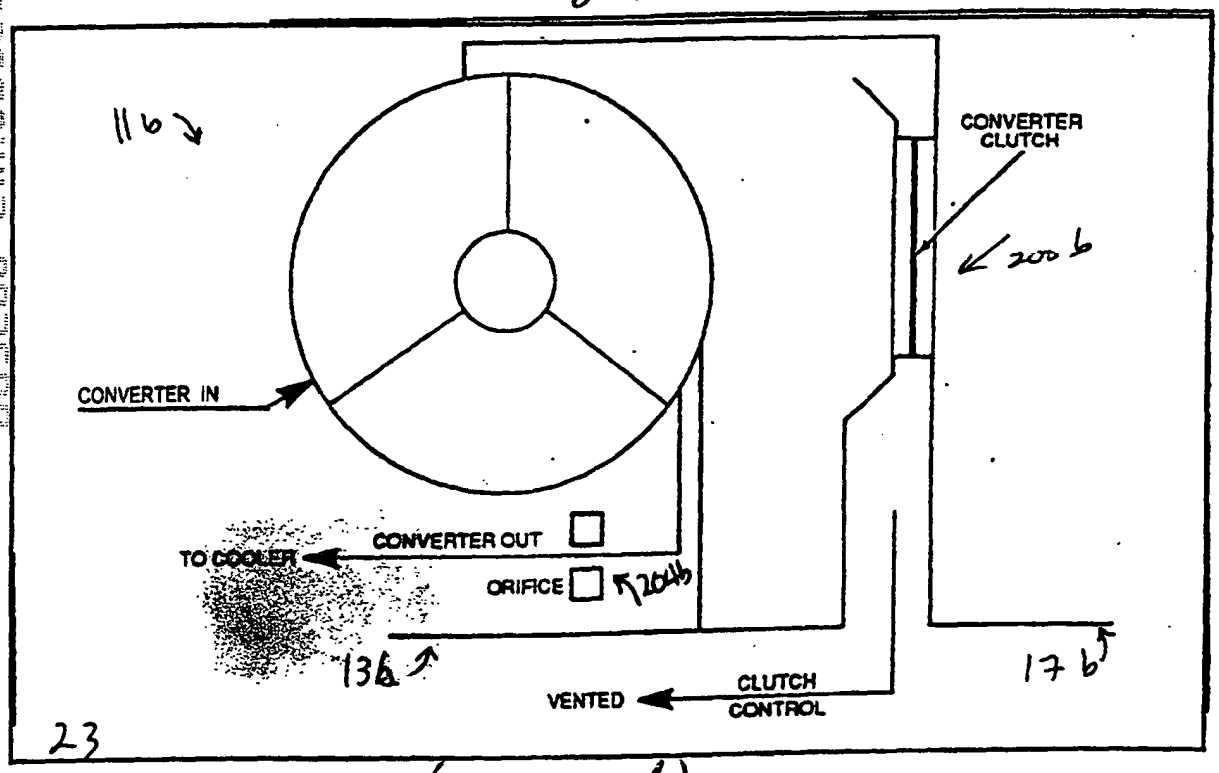


Figure 17 –Three-Circuit Lockup Mode (engaged)